

Japanese Kokai Patent Application No. P2002-77852A

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Job No.: 228-126578

Translated from Japanese by the McElroy Translation Company

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(19) JAPANESE PATENT  
OFFICE (JP)

(12) KOKAI TOKUHYO PATENT  
GAZETTE (A)

(11) PATENT APPLICATION PUBLICATION  
NO. 2002-77852  
(P2002-77852A)

(43) Publication Date: March 15, 2002

(51) Int. Cl. <sup>7</sup> :	Identification Codes:	FI	Theme Codes (Reference):
H 04 N 7/173	610	H 04 N 7/173	610A 5B049
G 06 F 17/60	ZEC	G 06 F 17/60	ZEC 5C064
	302		302E
H 04 N 5/765		H 04 N 5/781	510C
5/781			

Examination Request: Not filed No. of Claims: 4 (Total of 15 pages; OL)

(21) Filing No.: 2000-263603

(22) Filing Date: August 31, 2000

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Continued on last page

(54) Title: CONTENT DELIVERY SYSTEM AND STORAGE MEDIUM FOR STORING DELIVERY PROCESSING PROGRAM

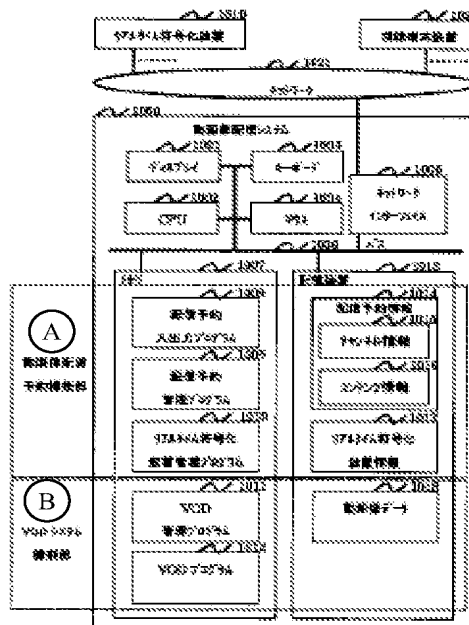
# (57) Abstract

## Problem

To deliver stored content and live content during preset time slots without distinguishing between that content, and to deliver the content while giving priority to a viewing request from the viewer with respect to stored content

## Means to solve

The system is provided with a function whereby a real-time encoding device is started and stopped; a delivery reservation function whereby desired delivery setting information is created, and time slots for delivery of stored content and live content are set for each piece of delivery setting information; a function whereby the delivery settings and delivery reservations associated with those delivery settings can be made via a network in the management of those delivery reservations; and a function whereby, in the management of those delivery reservations, the setting and the display of the delivery reservations can be made for a specified day only.



Key: A Moving image delivery reservation functional unit  
B VOD system functional unit  
1000 Moving image delivery system  
1001 Display  
1002 CPU

1003	Keyboard
1004	Mouse
1005	Network interface
1006	Bus
1007	Memory
1008	Delivery reservation input/output program
1009	Delivery reservation management program
1010	Real-time encoding device management program
1011	VOD management program
1012	VOD program
1013	Storage device
1014	Delivery reservation information
1015	Channel information
1016	Content information
1017	Real-time encoding device information
1018	Moving image data
1019	Real-time encoding device
1020	Viewing terminal device
1021	Network

### Claims

1. For a delivery system that delivers stored content that has been stored in advance and live content processed by a real-time encoding device, a content delivery system characterized in that it is equipped with a means that reserves and sets time slots in advance, delivering the aforementioned stored content and live content to a viewer; and a means that, for a viewing request from a viewer with respect to stored content, gives priority to the aforementioned viewing request and delivers specified stored content irrespective of the aforementioned settings.

2. The content delivery system recorded in Claim 1, characterized in that it is equipped with a means that creates one or more pieces of delivery setting information comprised of the delivery bit rate, delivery protocol, and delivery destination for the aforementioned content; and a means that reserves and sets in advance a time slot for delivery of stored content or live content for each piece of the aforementioned setting information.

3. The content delivery system recorded in Claim 1 or 2, characterized in that the aforementioned reservation settings are made via a network.

4. For the purpose of implementing the content delivery system recorded in Claim 1 or 2, a storage medium characterized in that it stores processing programs that respectively implement a means that, for a viewing request with respect to stored content, delivers stored content and live content to the viewer; a means that gives priority to and delivers specified stored content irrespective of the aforementioned settings; a means that creates delivery setting information; and a means that reserves and sets in advance a time slot for delivery of stored content or live content for each piece of the aforementioned setting information.

### Detailed explanation of the invention

[0001]

#### Technical field of the invention

The present invention pertains to a content delivery system and a storage medium that stores a delivery processing program; in particular, it pertains to a content delivery system that delivers content such as moving images to a viewer according to reservation settings and that delivers, for a viewing request from a viewer with respect to previously recorded content, content that is requested irrespective of a delivery reservation.

[0002]

#### Prior art

Current television broadcasts and radio broadcasts are broadcast by switching content—stored content, such as dramas, that is recorded in advance and is broadcast according to broadcast time slots, and live content, such as the news, that is photographed with a camera according to broadcast time slots and is broadcast as is in real time—according to fixed broadcast time slots. Therefore, the viewer receives these broadcasts by means of television or radio regardless of the type of content and then views or listens to the moving images or audio.

[0003]

In addition, web servers are currently installed on the internet throughout the world and they provide various information using the worldwide web (WWW). A user with internet access can use information-viewing software known as a web browser to access a web server from which he/she wishes to obtain information, and can access information such as text, still images, audio, and, if the bit rate is low, moving images.

[0004]

As the use of the internet and the WWW increases, computer networks known as intranets, wherein internet tools and WWW standards are introduced to an entire department internal network, company internal network or school internal network, are rapidly being established at businesses and public institutions such as universities. An intranet is built by means of web servers connected to a company or school internal network; documents such as the company's technical support information or company policies, procedure manuals, or telephone books are stored on that web server, and a user can use a web browser to view the documents on that web server, and thus can access all of the company's or university's information.

[0005]

In the midst of this situation, advances are being made in transmission technology and compression technology for moving images, and advances are being made in the development of a video-on-demand (hereinafter, VOD) system whereby users can use intranet or internet computer networks to view moving images when they wish. When a user using this VOD system views [images], he/she uses a web browser to access a page on which is stored a list of moving images that can be provided by the VOD system of the web server, and selects one piece of content that he/she desires to view from the list of moving images on that page, and thus is able to receive moving images from the web server.

[0006]

However, among other reasons, because the delivery of moving images is not the primary objective of a web server and because there is a limit to network throughput, it is difficult to transmit moving images with a high bit rate on the order of several Mb/s or more in real time via a network.

[0007]

Therefore, in recent years, a VOD system, for example, as recorded in Japanese Kokai Patent Application No. Hei 11[1999]-88862, has been proposed that is separated into a web server that holds a list of moving images capable of being provided by the VOD system and a VOD server that actually delivers the moving images. A user of this VOD system can directly call up moving images by accessing the web server using a web browser, browsing the list of moving images, and selecting the moving image data he/she wishes to view, thus transferring only information from the VOD server that delivers that moving image data.

[0008]

Problems to be solved by the invention

Said prior art has the following problems.

[0009]

With the aforementioned prior art, a problem exists in that television broadcasts and radio broadcasts only deliver content such as moving images during prescribed time slots, so content cannot be delivered according to a viewer's viewing request. In addition, a problem exists with VOD systems in that they only deliver moving images in response to a viewing request from the viewer, so content cannot be delivered according to a predetermined schedule.

[0010]

An objective of the present invention is to provide a content delivery system that is capable of delivering stored content and live content to a viewer according to preset delivery reservations without distinguishing therebetween, and that, for a viewing request from a user with respect to stored content, is capable of giving priority to that viewing request and delivering the stored content irrespective of delivery reservations.

[0011]

Furthermore, an objective of the present invention is to provide a content delivery system having a delivery reservation setting function whereby delivery settings (hereinafter, channels) [comprised of] the delivery bit rate, delivery protocol, and a delivery destination for a moving image are created, and time slots for the delivery of stored content and live content are set in advance for each channel.

[0012]

Furthermore, an objective of the present invention is to provide a content delivery system having a function whereby a channel and a delivery reservation associated with that channel are set via a network when that delivery reservation is set, and a function whereby the setting and the display of a delivery reservation are performed only for a specified day.

[0013]

Means to solve the problems

By means of the present invention, the aforementioned objectives are achieved by providing, for a delivery system that delivers stored content that has been stored in advance and live content processed by a real-time encoding device, a means that reserves and sets time slots in advance, delivering the aforementioned stored content and live content to a viewer; a means that, for a viewing request from a viewer with respect to stored content, gives priority to the aforementioned viewing request and delivers specified stored content irrespective of the aforementioned settings; a means that creates one or more pieces of delivery setting information comprised of the delivery bit rate, delivery protocol, and delivery destination for the aforementioned content; and a means that reserves and sets in advance a time slot for delivery of stored content or live content for each piece of the aforementioned setting information.

[0014]

By providing the present invention with the aforementioned constitution, stored content and live content can be delivered during preset time slots without distinguishing between the

content, and the content can be delivered while giving priority to a viewing request from the viewer with respect to stored content.

[0015]

In addition, each of the aforementioned means can be constructed by means of a computer processing program and can be installed in a computer through various media, such as a storage device by means of a disk-type recording medium, a semiconductor storage device, or a communication network.

[0016]

Embodiment of the invention

In the following, embodiments of the content delivery system according to the present invention will be explained in detail with reference to figures.

[0017]

Figure 1 is a block diagram showing the configuration of a content delivery system according to one embodiment of the present invention. This embodiment of the present invention is one wherein the present invention is applied to the delivery of moving images. In Figure 1, 1000 is a moving image delivery system; 1001 is a display; 1002 is a CPU; 1003 is a keyboard; 1004 is a mouse; 1005 is a network interface; 1006 is a bus; 1007 is a memory; 1008 is a delivery reservation input/output program; 1009 is a delivery reservation management program; 1010 is a real-time encoding device management program; 1011 is a VOD management program; 1012 is a VOD program; 1013 is a storage device; 1014 is delivery reservation information; 1015 is channel information; 1016 is content information; 1017 is real-time encoding device information; 1018 is moving image data; 1019 is a real-time encoding device; 1020 is a viewing terminal device; and 1021 is a network.

[0018]

As shown in Figure 1, moving image delivery system 1000 is constructed by providing: display 1001, which is the output device; CPU 1002, for controlling the system; keyboard 1003, which is the input device; mouse 1004; network interface 1005, which is an input/output interface allowing moving image delivery system 1000 to exchange data with an external device; bus 1006, for the exchange of commands or data; memory 1007, which stores programs and the like for the purpose of executing processes by means of CPU 1002; and storage device 1013, which stores various process data. This moving image delivery system 1000 is connected, by means of the internet or a like network 1021, to real-time encoding device 1019 (hereinafter,

RTE), which sequentially and immediately encodes moving images acquired from a camera or the like imaging device, and to viewing terminal device 1020, which has a web browser or the like information-viewing means that is used when the viewer views the moving images provided by moving image delivery system 1000. In addition, the dotted lines drawn next to viewing terminal 1020 and the like indicate that there can be more than one of these devices.

[0019]

Memory 1007 stores processing programs that are for the purpose of executing the functions pertaining to the present invention and that are stored in storage device 1013 and transferred in response to a command from CPU 1002. Based on the functions, these programs are divided into two units, a moving image delivery reservation functional unit and a VOD system functional unit. The moving image delivery reservation functional unit is comprised of three programs, a delivery reservation input/output program 1008, delivery reservation management program 1009, and real-time encoding device management program 1010. In addition, the VOD system functional unit is comprised of two programs, a VOD management program 1011 and VOD program 1012. Furthermore, memory device 1013 stores delivery reservation information 1014 comprised of channel information 1015 and content information 1016, real-time encoding device information 1017, and moving image data 1018.

[0020]

The aforementioned delivery reservation input/output program 1008 is a program that makes settings such as creating new delivery reservations, changing [said reservations], or deleting [said reservations], with respect to two programs to be explained later, delivery reservation management program 1009 and real-time encoding device management program 1010; in addition, it controls the display [of information] such that the status of those delivery reservation settings can be recognized clearly, and is a program that provides a communication environment for a manager and the system shown in the figure.

[0021]

Delivery reservation management program 1009 holds delivery reservation settings from delivery reservation input/output program 1008 and communicates with the VOD system functional unit—comprised of the two programs VOD management program 1011 and VOD program 1012, to be explained later—according to those delivery reservation settings, starting and stopping the delivery of moving images. Delivery setting reservations from delivery reservation input/output program 1008 are stored in delivery reservation setting information 1014 of storage device 1013. Delivery reservation setting information 1014 stores channel



information 1015, which describes channels that are delivery settings specific to the VOD system functional unit, and content information 1016, which is information specific to the stored content and live content that is actually delivered.

[0022]

Real-time encoding device management program 1010 holds settings from delivery reservation input/output program 1008 related to RTE, and replies with specified RTE setting information according to requests from delivery reservation management program 1009. RTE setting information from delivery reservation input/output program 1008 is stored in real-time encoding device information 1017 of storage device 1013.

[0023]

VOD management program 1011, which is one component of the VOD system functional unit, manages when services—whereby stored moving image data 1018 are delivered to a user who has generated a viewing request—are provided. In addition to providing management related to a viewer who has generated a viewing request, VOD management program 1011 manages delivery start and stop requests from delivery reservation management program 1009 of moving image delivery system 1000.

[0024]

VOD program 1012 is a program that actually delivers moving image data 1018 according to instructions from VOD management program 1011.

[0025]

Moving image delivery system 1000 executes the functions pertaining to the present invention by using CPU 1002 to execute the processes according to delivery reservation input/output program 1008, delivery reservation management program 1009, real-time encoding device management program 1010, VOD management program 1011, and VOD program 1012.

[0026]

Next, the configurations of tables that store various types of information used by each of the aforementioned programs in processing according to the embodiment of the present invention will be explained.

[0027]

Figure 2 shows the configuration of a table that stores the components of channel information 1015; Figure 3 shows the configuration of a table that stores the components of the RTE information 1017; Figure 4 shows the configuration of a table that stores the components of content information 1016 of the stored content and the live content; Figure 5 shows the configuration of a table that stores the RTE initialization setting elements for the content information 1016 of live content.

[0028]

As shown in Figure 2, channel information 1015 is comprised of six items: a channel name 1601 for the purpose of identifying the channel; a VOD program operating system name 1602 that is specified when the VOD program 1012 that delivers the content restricts the operating system name; the maximum bit rate 1603 when content is delivered; the delivery protocol 1604 when content is delivered; the delivery IP address 1605 when the delivery is by the IP multicast method; and the delivery IP port 1606.

[0029]

As shown in Figure 3, RTE information 1017 is comprised of three items: an RTE name 1701 for the purpose of identifying the RTE; an IP address 1702 for that RTE; and a port number 1703.

[0030]

As shown in Figure 4, content information 1016 of the stored content and the live content is comprised of 11 items: the name 1801 of the delivering channel; the content name 1802 of the stored content being delivered; the delivery start time 1803; the delivery end time 1804; immediate delivery 1805 of information regarding whether to start delivery immediately after a reservation setting; periodic delivery 1806 of information regarding whether to deliver every day in the time slot between the specified delivery start time 1803 and delivery end time 1804; delivery mode 1807, which specifies whether to simply deliver, as with stored content, or to deliver while recording live images, as with live content; the RTE name 1808 used with the delivered live content; the RTE initialization set values 1809 for live content; the recorded content name 1810, which is the content name when the content is to be stored after recording when moving images are delivered while being recorded, as with live content; and the recorded content access privilege 1811, which is the access privilege for that recorded content.

[0031]

As shown in Figure 5, the aforementioned RTE initialization set values 1809, which are the RTE initialization set value elements for content information 1016 of live content, are comprised of 8 items: the encoding algorithm 1901, which is a video encoding method; the resolution 1902, which is the pixel count of the video; the number of frames 1903 for one second of video; the video bit rate 1904; the encoding algorithm 1905, which is the audio encoding method; the audio mode 1906—for example, stereo, or monaural; the sampling rate 1907 for digitization of audio; and the audio bit rate 1908.

[0032]

Figure 6 is a flow chart explaining the process when delivery reservation input/output program 1008 creates a new channel that sets delivery reservations; in the following, this flow chart will be explained.

[0033]

(1) When the process begins, delivery reservation input/output program 1008 specifies desired channel settings and transmits to VOD management program 1011 an addition request for the purpose of adding those settings to the channel list as one channel (steps 1101, 1102).

[0034]

(2) VOD management program 1011 receives the aforementioned request from delivery reservation input/output program 1008, confirms that the request is a channel addition request, and transmits the channel addition request to delivery reservation management program 1009 (steps 1103, 1104).

[0035]

(3) Delivery reservation management program 1009 receives the channel addition request from VOD management program 1011, creates a channel by means of the specified settings, saves those set values in channel information 1015 of delivery reservation information 1014 as shown in Figure 2, and then replies with the result thereof to delivery reservation input/output program 1008 through VOD management program 1011 (steps 1105-1107).

[0036]

(4) When, according to the returned result, the addition request was successful, delivery reservation input/output program 1008 adds the created channel to the channel list and displays [the list]; when the request fails, the program displays details of that failure (step 1108).

[0037]

Figure 7 is a flow chart explaining the process when delivery reservation input/output program 1008 creates a new RTE that sets delivery reservations that use RTE; in the following, this flow chart will be explained.

[0038]

(1) When the process begins, delivery reservation input/output program 1008 specifies desired RTE settings and transmits to VOD management program 1011 an addition request for the purpose of adding those settings to the RTE list as one RTE (steps 1201, 1202).

[0039]

(2) VOD management program 1011 receives the aforementioned request from delivery reservation input/output program 1008, confirms that the request is an RTE addition request, and transmits the RTE addition request to real-time encoding device management program 1010 (steps 1203, 1204).

[0040]

(3) Real-time encoding device management program 1010 receives the RTE addition request from VOD management program 1011, creates an RTE by means of the specified settings, saves those set values in real-time encoding device information 1017 as shown in Figure 3, and then replies with the result thereof to delivery reservation input/output program 1008 through VOD management program 1011 (steps 1205-1207).

[0041]

(4) When, according to the returned result, the addition request was successful, delivery reservation input/output program 1008 adds the created RTE to the RTE list and displays [the list]; when the request fails, the program displays details of that failure (step 1208).

[0042]

Figure 8 is a flow chart explaining the process when delivery reservation input/output program 1008 registers delivery reservations with a given channel; in the following, this flow chart will be explained.

[0043]

(1) When the process begins, delivery reservation input/output program 1008 specifies the delivery reservation settings, such as the desired channel and a delivery time slot, and transmits to VOD management program 1011 an addition request for the purpose of adding those reservation settings to the reservation list for the specified channel (steps 1301, 1302).

[0044]

(2) VOD management program 1011 receives the aforementioned request from delivery reservation input/output program 1008, confirms that the request is a delivery reservation addition request, and transmits the delivery reservation addition request to delivery reservation management program 1009 (steps 1303, 1304).

[0045]

(3) Delivery reservation management program 1009 receives the delivery reservation addition request from VOD management program 1011, creates delivery reservations in the specified channel, saves those set values in content information 1016 of delivery reservation information 1014 as shown in Figure 4, associates [said content information] with the channel information 1015 of the specified channel, and then replies with the result thereof to delivery reservation input/output program 1008 through VOD management program 1011 (steps 1305-1307).

[0046]

(4) When, according to the returned result, the addition request was successful, delivery reservation input/output program 1008 displays the created delivery reservations on the specified channel as a reservation list; when the request fails, the program displays details of that failure (step 1308).

[0047]

In addition, the aforementioned delivery reservations can be set in units of one day, and these can be displayed as a reservation list.

[0048]

Figure 9 is a flow chart explaining the process when delivery reservation management program 1009 begins delivery according to delivery reservations registered in a channel; in the following, this flow chart will be explained.

[0049]

(1) Delivery reservation management program 1009 checks channel information 1015 of delivery reservation information 1014 and content information 1016 at fixed time intervals and confirms whether the current time is reserved for the delivery of content and whether the content is to be delivered immediately. When there is no reserved content and no content to be delivered immediately, [the program] does nothing, or begins the process for this step after a fixed amount of time has elapsed (step 1401).

[0050]

(2) At step 1401, if there is content that is reserved for delivery at the current time, or content to be delivered immediately, delivery reservation management program 1009 judges whether the content that is reserved for delivery at the current time is stored content or live content, and if it is live content, a process based on Figure 10 that is to be explained later is performed (steps 1402, 1404).

[0051]

(3) When the judgment according to step 1402 is that the content reserved for delivery is stored content, delivery reservation management program 1009 transmits the delivery reservation information 1014 pertaining to the specified content and a delivery request to VOD management program 1011 (step 1403).

[0052]

(4) VOD management program 1011 receives the delivery request from delivery reservation management program 1009 at step 1403 or in the process to be explained later in Figure 10, confirms that the request is a delivery start request and, based on the received delivery reservation information 1014, transmits the delivery start request and delivery reservation information 1014 to the desired VOD program 1012 (step 1405).

[0053]

(5) VOD program 1012 initializes the delivery settings based on the received delivery reservation information 1014, returns the result to delivery reservation management program 1009 via VOD management program 1011, and delivery reservation management program 1009 receives this reply, thus ending the delivery reservation start process (steps 1406-1408).

[0054]

Figure 10 is a flow chart explaining the process up to the point where the delivery request is transmitted from delivery reservation management program 1009 to VOD management program 1011 when the content for which delivery reservations are started is live content; in the following, this flow chart will be explained. This process starts when it is determined with the process in step 1402 of Figure 9 that the content being delivered is live content.

[0055]

(1) To obtain RTE information 1017, which is the information pertaining to the live content that is reserved for delivery at the current time, the delivery reservation management program transmits the delivery reservation information 1014 pertaining to the specified live content to RTE management program 1010 and makes an inquiry (step 1501).

[0056]

(2) RTE management program 1010 obtains from RTE information 1017 the RTE-related information specified by the received delivery reservation information 1014 and returns the result to delivery reservation management program 1009 (steps 1502, 1503).

[0057]

(3) After delivery reservation management program 1009 receives the RTE information returned from RTE management program 1010, it queries RTE management program 1010, by means of that received RTE information, with regard to the operational state of that RTE (step 1504).

[0058]

(4) RTE management program 1010 obtains the operational state of the RTE specified in the query from delivery reservation management program 1009 and returns that operational state to delivery reservation management program 1009 (steps 1505, 1506).

[0059]

(5) Delivery reservation management program 1009 transmits to VOD management program 1011 a delivery request and the RTE information, the RTE operational state, and the delivery reservation information 1014 pertaining to the specified RTE content, which were returned from RTE management program 1010 (step 1507).

[0060]

(6) VOD management program 1011 transmits a startup request to the RTE specified by the information received from delivery reservation management program 1009, and receives a startup success reply from that RTE. In addition, VOD management program 1011 transmits an initialization request to the RTE specified by the received information, and receives an initialization success from that RTE. Next, the process in step 1405 of Figure 9 ensues (steps 1508-1511).

[0061]

Figure 11 shows an example of the screen that is displayed on display 1001 when delivery reservation input/output program 1008 is executed. This example screen controls the previously explained delivery reservation management program 1009 and RTE management program 1010, and is displayed on display 1001 when delivery reservation input/output program 1008, which is the program furnished with a communication environment for a manager and the system shown in Figure 1, is executed.

[0062]

Lists are displayed on the screen every time a channel name or an RTE name is created, and when a delivery reservation for a given channel is set, a slot is displayed in the specified time slot for that channel. The display of delivery reservations is such that one day's worth of reservations (hereinafter, a schedule) is displayed, and the one-day schedule for a specified day is displayed by specifying that date. In addition, the RTE list displays the operational state for each [RTE].

[0063]

Figure 12 is a block diagram showing the configuration of a content delivery system according to another embodiment of the present invention. This other embodiment of the present invention is one for which the present invention is applied to the delivery of moving images. In Figure 12, 2001 is an RTE, 2002 is a VOD system, 2003 is a viewing terminal device, 2004 and 2005 are personal computers, and 2006 is a network.

[0064]

This other embodiment of the present invention shown in Figure 12 is comprised of an RTE 2001 that sequentially and immediately encodes moving images acquired from a camera or the like imaging device; a VOD system 2002, which is the VOD system functional unit of the moving image delivery system 1000 in Figure 1, and which delivers stored moving image data to



a user who has produced a viewing request; a viewing terminal device 2003 that has a web browser or the like information-viewing means that is used when the viewer views the moving images provided by VOD system 2002; and personal computers (PCs) 2004, 2005 that divide and execute the processing programs of the moving image delivery reservation functional unit that is a component of moving image delivery system 1000 in Figure 1; in addition all of these are connected to a network 2006.

[0065]

With the aforementioned [embodiment], PC 2004 executes delivery reservation management program 1009 and RTE management program 1010, and PC 2005 executes delivery reservation input/output program 1008. In addition, the dotted lines drawn next to PC 2005 and the like indicate that there can be more than one of these devices.

[0066]

By means of the aforementioned configuration, with this other embodiment of the present invention, the work of setting delivery reservations does not have to be performed by moving image delivery system 1000; it can be performed by PC 2005 connected to network 2006. Furthermore, providing multiple PCs 2005 enables multiple managers to set delivery reservations at different locations.

[0067]

Preferred embodiments of the present invention were explained above; however, the present invention is not limited to the aforementioned embodiments, and various embodiments differing from those described above can be implemented.

[0068]

Furthermore, the various programs in the aforementioned embodiments of the present invention can be stored and provided on a recording medium such as an FD, CDROM, MO, or DVD, and the present invention can be implemented using these.

[0069]

By means of the aforementioned embodiments of the present invention, stored content and live content can be delivered during preset time slots without distinguishing between the content, and the content can be delivered while giving priority to a viewing request from the viewer with respect to stored content. Furthermore, by means of the embodiments of the present invention the delivery settings and delivery reservations associated with those delivery settings

can be made via a network, so it is possible to make content delivery settings and delivery reservations as well as to browse those settings from a terminal via a network, without [the user] being in front the moving image delivery system and the moving image delivery reservation management device thereof.

[0070]

Furthermore, by providing a function whereby a date can be selected by means of the aforementioned embodiments of the present invention, it is possible to make and to display delivery reservation settings for only a specified day, so when the delivery settings and delivery reservations are managed, the details thereof can be set easily and accurately without confusion.

[0071]

Effect of the invention

As explained above, by means of the present invention, stored content and live content can be delivered during preset time slots without distinguishing between the content, and the content can be delivered while giving priority to a viewing request from the viewer with respect to stored content.

#### Brief description of the figures

Figure 1 is a block diagram showing the configuration of a content delivery system according to one embodiment of the present invention.

Figure 2 is a diagram showing the configuration of a table that stores the components of the channel information.

Figure 3 is a diagram showing the configuration of a table that stores the components of the RTE information.

Figure 4 is a diagram showing the configuration of a table that stores content information for stored content and for live content.

Figure 5 is a diagram showing the configuration of a table that stores the RTE initialization setting elements for the content information of live content.

Figure 6 is a flow chart explaining the process when the delivery reservation input/output program creates a new channel that sets delivery reservations.

Figure 7 is a flow chart explaining the process when the delivery reservation input/output program creates a new RTE that sets delivery reservations that use the RTE.

Figure 8 is a flow chart explaining the process when the delivery reservation input/output program registers a delivery reservation with a given channel.

Figure 9 is a flow chart explaining the process when the delivery reservation management program begins delivery according to a delivery reservation registered in a channel.

Figure 10 is a flow chart explaining the process up to the point where the delivery request is transmitted from the delivery reservation management program to the VOD management program when the content for which delivery reservations are started is live content.

Figure 11 is a diagram showing an example of the screen that is displayed on the display when the delivery reservation input/output program is executed.

Figure 12 is a block diagram showing the configuration of a content delivery system according to another embodiment of the present invention.

#### Explanation of symbols

1000	Moving image delivery system
1001	Display
1002	CPU
1003	Keyboard
1004	Mouse
1005	Network interface
1006	Bus
1007	Memory
1008	Delivery reservation input/output program
1009	Delivery reservation management program
1010	RTE management program
1011	VOD management program
1012	VOD program
1013	Storage device
1014	Delivery reservation information
1015	Channel information
1016	Content information
1017	RTE information
1018	Moving image data
1019	RTE
1020	Viewing terminal device
1021, 2006	Network
2001	RTE
2002	VOD system
2003	Viewing terminal device

2004, 2005    Personal computer

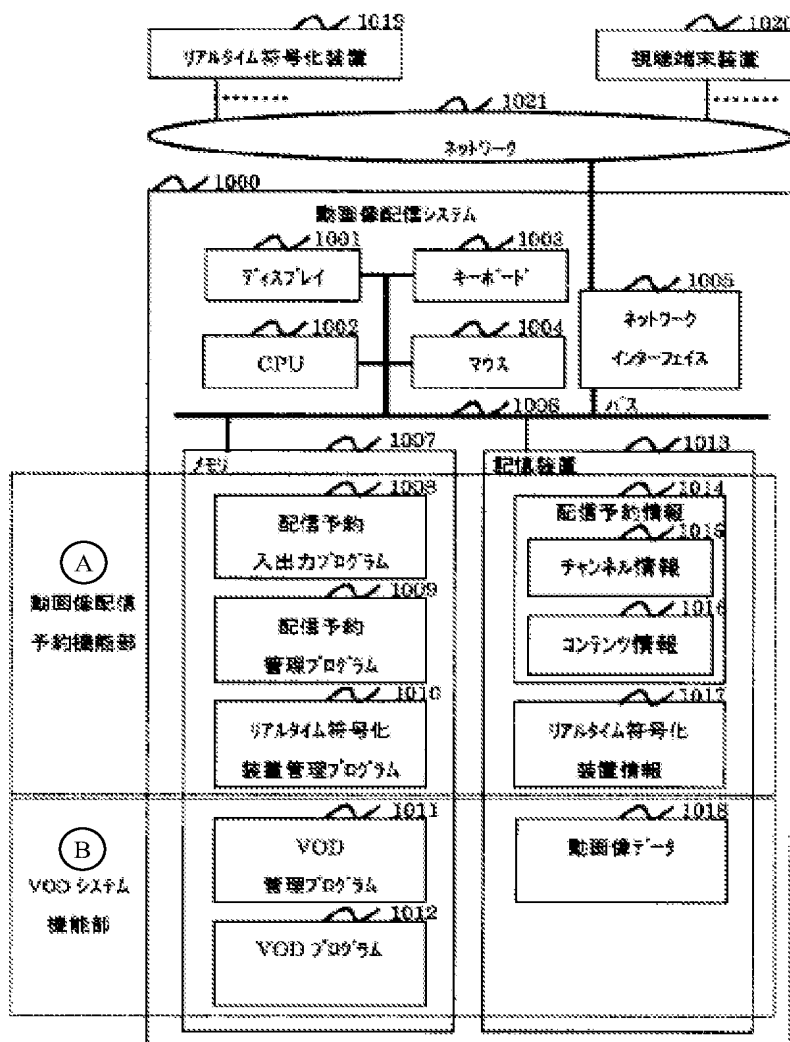


Figure 1

- Key:
- A    Moving image delivery reservation functional unit
  - B    VOD system functional unit
  - 1000    Moving image delivery system
  - 1001    Display
  - 1002    CPU
  - 1003    Keyboard
  - 1004    Mouse
  - 1005    Network interface
  - 1006    Bus
  - 1007    Memory

- 1008 Delivery reservation input/output program
- 1009 Delivery reservation management program
- 1010 Real-time encoding management program
- 1011 VOD management program
- 1012 VOD program
- 1013 Storage device
- 1014 Delivery reservation information
- 1015 Channel information
- 1016 Content information
- 1017 Real-time encoding information
- 1018 Moving image data
- 1019 Real-time encoding device
- 1020 Viewing terminal device
- 1021 Network

1601	1602	1603	1604	1605	1606
Channel	VodStream	MaxBitRate	DeliveryProtocol	DeliveryIP	DeliveryPort
Channel1	VodStream1	10000000	RTP	###.###.###.###	###
Channel2	VodStream2	20000000	HTTP	—	—
Channel3	---	---	BOTH	###.###.###.###	###

Figure 2

- Key:
- 1601 Channel name
  - 1602 VOD program operating system
  - 1603 Maximum bit rate
  - 1604 Delivery protocol
  - 1605 Delivery IP address
  - 1606 Delivery IP port

1701	1702	1703
Real-time encoding device name	Address	Port number
RTE1	###.###.###.###	###
RTE2	###.###.###.###	###
RTE3	###.###.###.###	###

Figure 3

- Key:
- 1701 Real-time encoding device name
  - 1702 Address
  - 1703 Port number

1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811
Channel1	Content1	---	00/02/03 12:00	T	F	1	---	---	---	---
Channel2	---	00/02/01 15:00	00/02/03 16:00	F	T	2	RTE1	図10 ※B	Encl	0
Channel3	Content3	00/02/01 21:00	00/02/03 21:30	F	F	1	---	---	---	---

(A) ※1:測配信 ※2:定期的配信 ※3:配信モード ※4:リアルタイム符号化装置名  
 ※5:RTE 初期化設定値 ※6:録画コンテンツ名 ※7:録画コンテンツアクセス権

Figure 4

- Key: A \*1: Immediate delivery; \*2: Periodic delivery; \*3: Delivery mode; \*4: Real-time encoding device name  
 \*5: RTE initialization set values; \*6: Recorded content name; \*7: Recorded content access privilege
- B See Figure 10
- 1801 Channel name  
 1802 Content name  
 1803 Delivery start time  
 1804 Delivery end time  
 1805 \*1  
 1806 \*2  
 1807 \*3  
 1808 \*4  
 1809 \*5  
 1810 \*6  
 1811 \*7

1901	1902	1903	1904	1905	1906	1907	1908
MPEG-4	352x288	185%	384kb/s	MP3G-1	stereo	44.1kHz	128kb/s

(A) (B)

Figure 5

- Key: A Video  
 B Audio
- 1901 Encoding algorithm  
 1902 Resolution  
 1903 Frame count  
 1904 Bit rate  
 1905 Encoding algorithm  
 1906 Mode

1907 Sampling rate  
1908 Bit rate

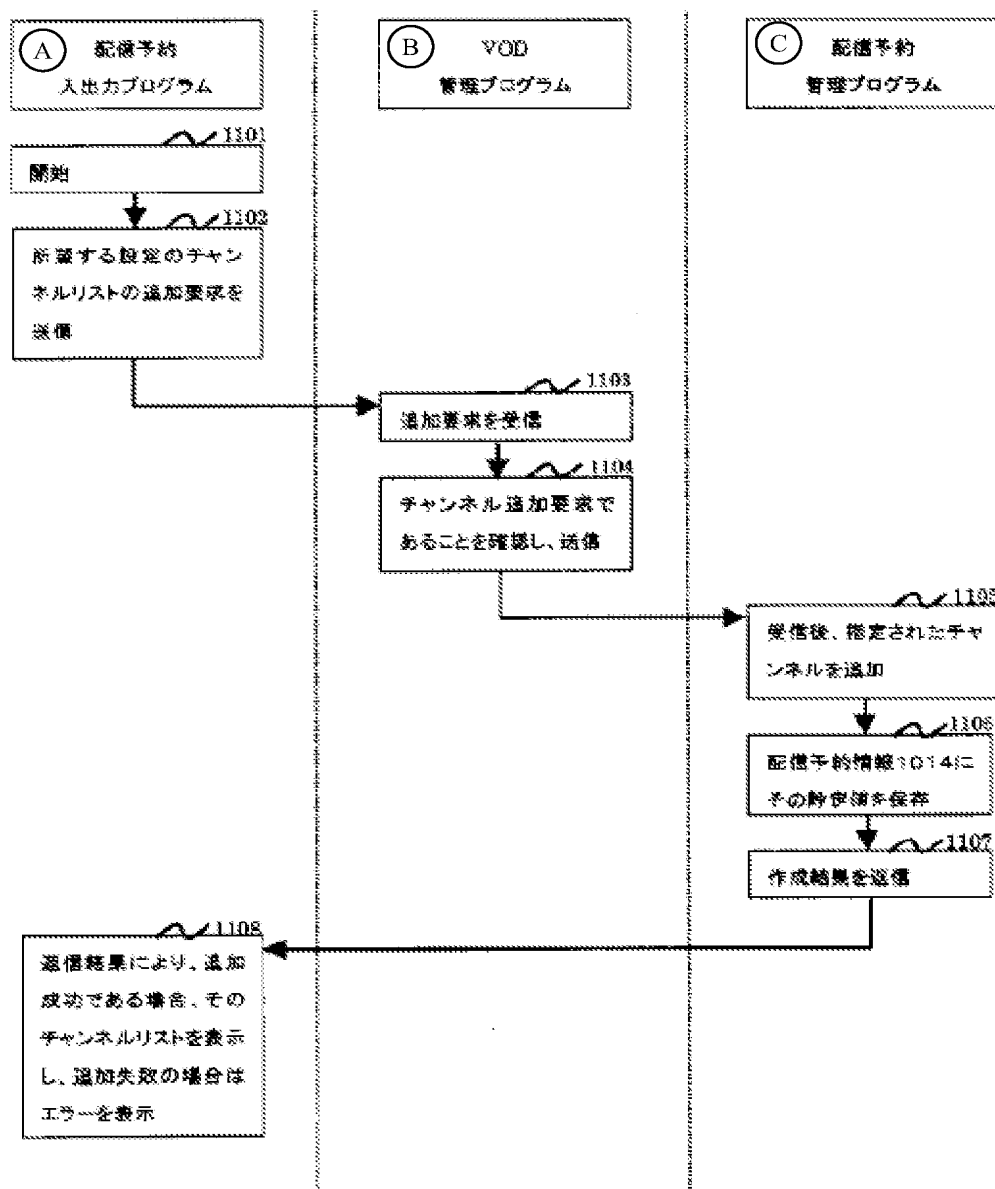


Figure 6

Key: A Delivery reservation input/output program  
 B VOD management program  
 C Delivery reservation management program  
 1101 Start  
 1102 Transmit request for addition of [channel with] desired settings to channel list

- 1103 Receive addition request
- 1104 Confirm that it is a channel addition request, and then transmit
- 1105 After receiving, add specified channel
- 1106 Save set values in delivery reservation information 1014
- 1107 Return result of creation
- 1108 When, according to the returned result, the addition was successful, display that channel list; when the addition has failed, display an error



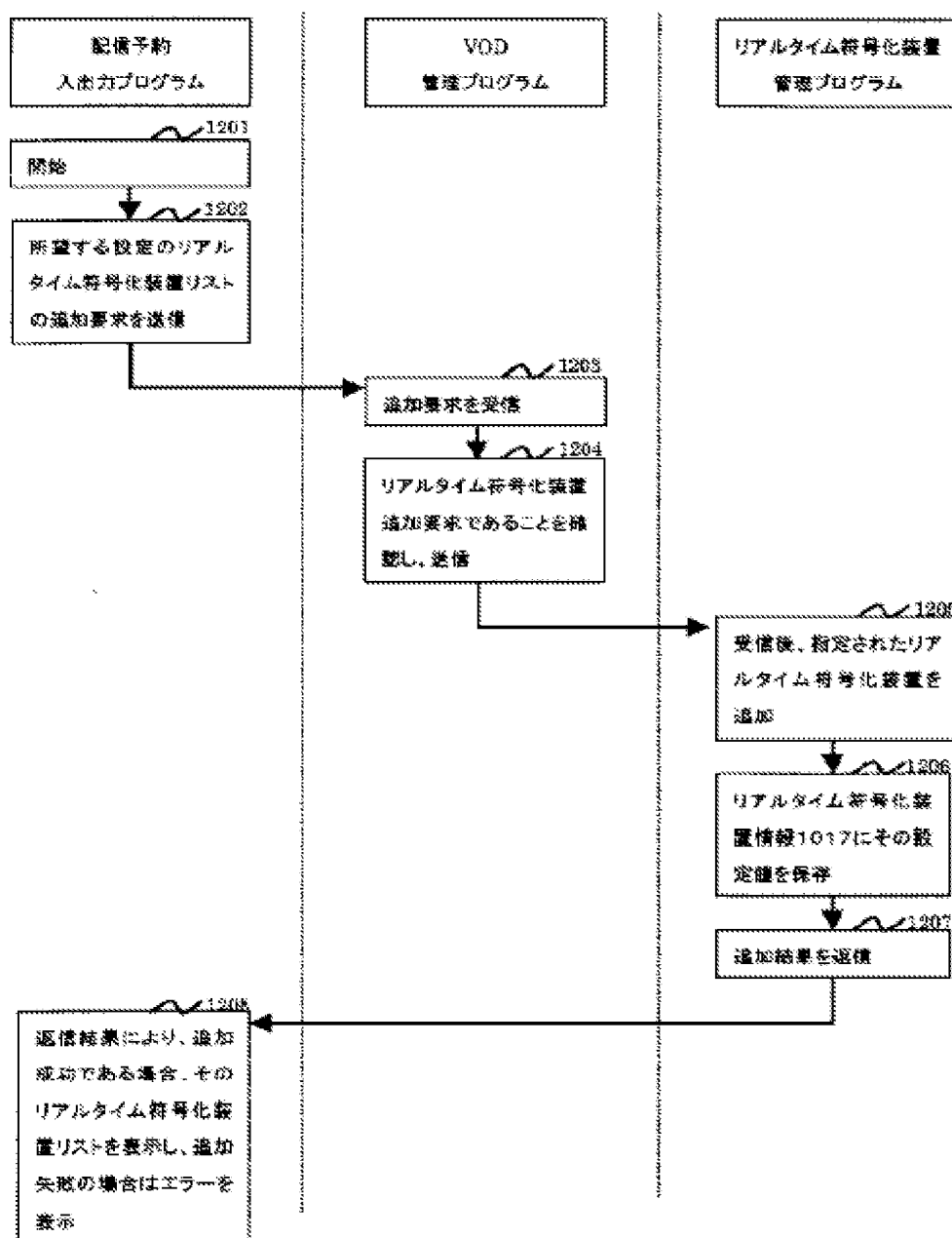


Figure 7

- Key:
- A     Delivery reservation input/output program
  - B     VOD management program
  - C     Real-time encoding device management program
  - 1201   Start
  - 1202   Transmit request for addition of [RTE with] desired settings to real-time encoding device list

- 1203 Receive addition request  
 1204 Confirm that it is a real-time encoding device addition request, and then transmit  
 1205 After receiving, add specified real-time encoding device  
 1206 Save set values in real-time encoding device information 1017  
 1207 Return addition result  
 1208 When, according to the returned result, the addition was successful, display that real-time encoding device list; when the addition has failed, display an error

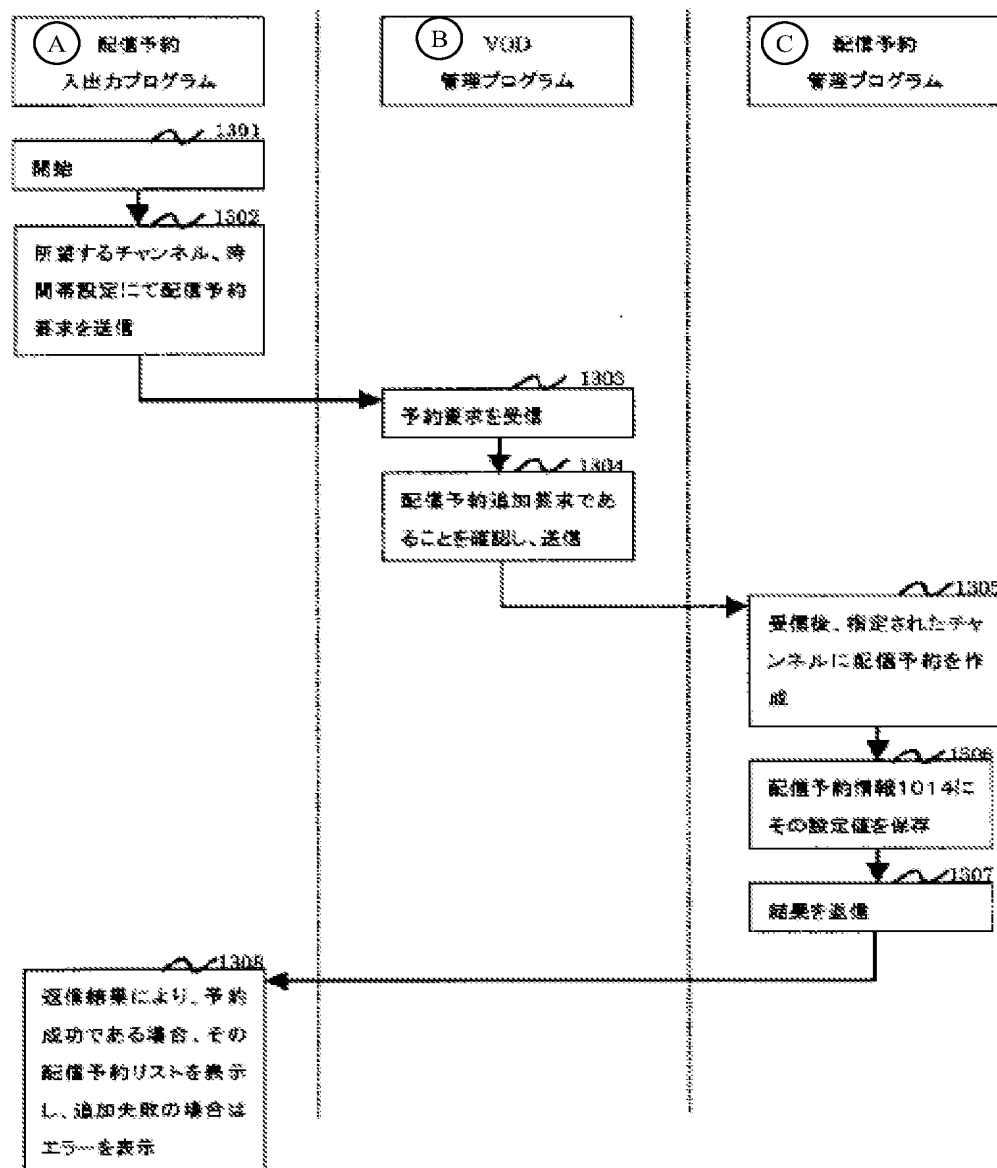


Figure 8

Key: A Delivery reservation input/output program

- B VOD management program  
 C Delivery reservation management program  
 1301 Start  
 1302 Transmit delivery reservation request for desired channel and time slot settings  
 1303 Receive reservation request  
 1304 Confirm that it is a delivery reservation addition request, then transmit  
 1305 After receiving, create delivery reservation in specified channel  
 1306 Save the set values in delivery reservation information 1014  
 1307 Return result  
 1308 When, according to the returned result, the reservation was successful, display that delivery reservation list; when the addition has failed, display an error

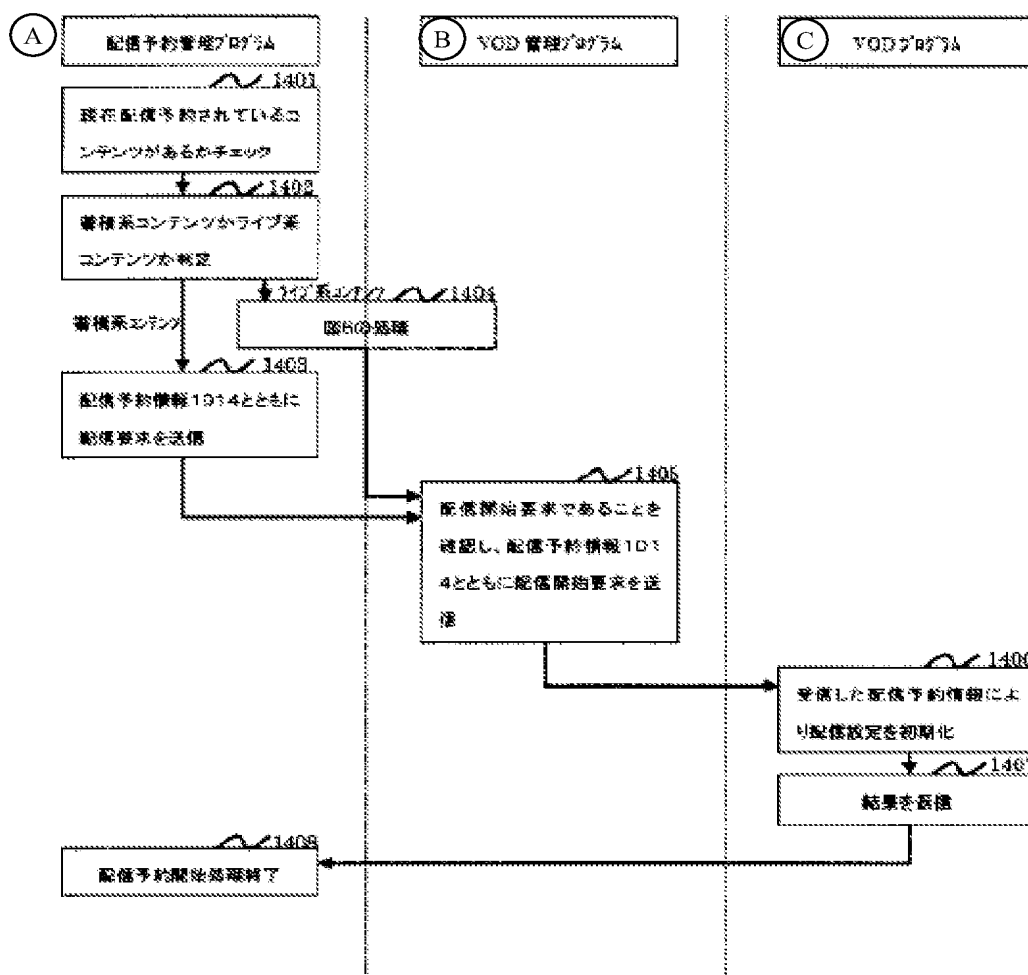


Figure 9

- Key: A Delivery reservation management program  
 B VOD management program  
 C VOD program

- D     Stored content
- E     Live content
- 1401   Check whether there is currently reserved content
- 1402   Determine whether it is stored content or live content
- 1403   Transmit delivery request and delivery reservation information 1014
- 1404   Figure 6 process
- 1405   Confirm that it is a delivery start request, transmit delivery reservation information 1014 and delivery start request
- 1406   Initialize delivery settings based on received delivery reservation information
- 1407   Return result
- 1408   Delivery reservation start process ends

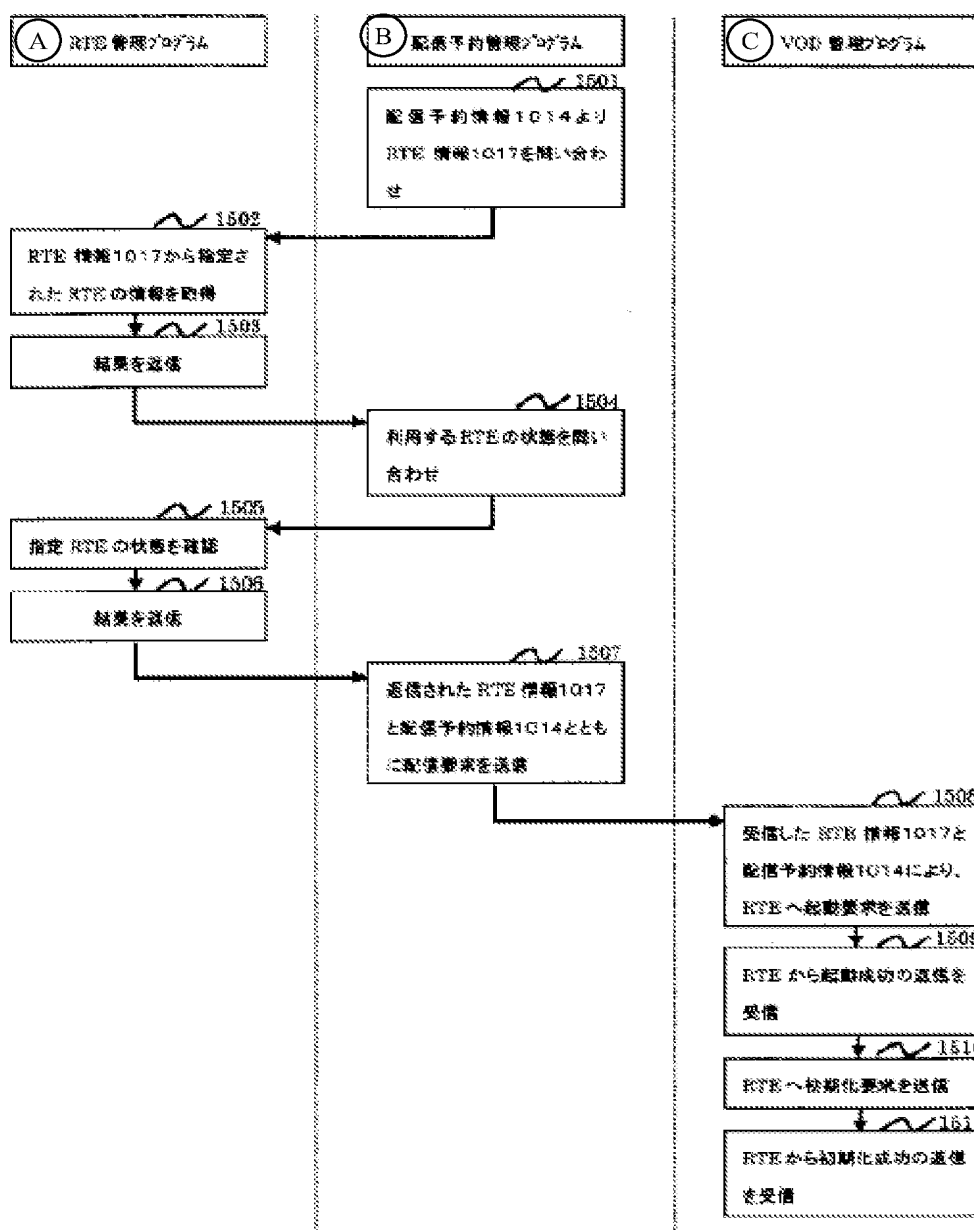


Figure 10

- Key:
- A RTE management program
  - B Delivery reservation management program
  - C VOD management program
  - 1501 Query RTE information 1017 based on delivery reservation information 1014
  - 1502 Obtain specified RTE information from RTE information 1017
  - 1503 Return result
  - 1504 Query the status of RTE to be used

- 1505 Confirm status of specified RTE  
 1506 Return result  
 1507 Transmit delivery request together with the returned RTE information 1017 and the delivery reservation information 1014  
 1508 Transmit startup request to the RTE by means of [sic; possibly, based on] the received RTE information 1017 and delivery reservation information 1014  
 1509 Receive startup success reply from RTE  
 1510 Transmit initialization request to RTE  
 1511 Receive initialization success reply from RTE

The screenshot shows a software interface with several sections. At the top, there's a header bar with a file icon (A), a title bar (D), and a close button (E). Below this is a main content area. On the left, there's a tree view (B) showing a directory structure with folders like 'Dir1', 'Dir2', 'Dir3', 'Dir4', 'Dir5', and 'Dir6'. The main area is divided into two panes. The left pane (D) shows '番組系コンテンツ名' (Program Content Name) with 'Screen1'. The right pane (E) shows '番組系コンテンツ情報ファイル' (Program Content Information File) with 'Server1/EC/Stream1' (F). Below the main area is a section for channel information (B) showing 'チャンネル名' (Channel Name) as '2000/12/11 Tuesday' and a time slot from 09:00 to 15:00. Below this is a section for RTE information (C) showing 'RTE名' (RTE Name) and 'STATUS' (Status). The status is '稼働中' (Idle) (G) for 'RTE1' and '稼働中' (Idle) (G) for 'RTE2'. The status is '停止中' (Stopped) (H) for 'RTE3'.

Figure 11

- Key: A File (F)  
 B Channel name  
 C RTE name  
 D Stored content name  
 E Stored content information file  
 F Server1/C#/Stream1  
 G Idle  
 H Stopped

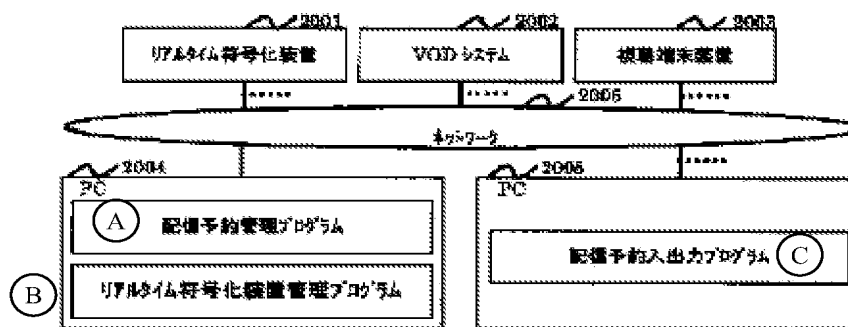


Figure 12

- Key:
- A     Delivery reservation management program
  - B     Real-time encoding device management program
  - C     Delivery reservation input/output program
  - 2001   Real-time encoding device
  - 2002   VOD system
  - 2003   Viewing terminal device
  - 2006   Network

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F Terms (Reference):     5B049 BB11 CC06 CC11 CC31 DD01  
                                  EE01 EE07 FF03 FF04 GG04  
                                  GG07  
                                  5C064 BA01 BB05 BC18 BC26 BD02  
                                  BD03 BD08 BD09